Cuphea nivea (Lythraceae), a New Species from Bolivia

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ABSTRACT. *Cuphea nivea* from northwestern Bolivia is described and illustrated. Seed and pollen characters relate it most closely to *C. ciliata*, a species occurring from southern Venezuela to southern Peru. The small xylopodium and heath-like leaves of the species suggest it is adapted to grassland habitats that experience seasonal fires.

RESUMEN. En el presente trabajo se describe e ilustra *Cuphea nivea* de la región noroccidental de Bolivia. Los caracteres de las semillas y de los granos de polen la relacionan muy estrechamente con *C. ciliata*, una especie que se distribuye desde el sur de Venezuela hasta el sur de Perú. El xilopodio pequeño y las hojas ericoides de la especie sugieren su adaptación a hábitats dominados por pastos que sufren impactos de quemas estacionales.

Key words: Bolivia, *Cuphea*, grasslands, Lythraceae.

Recent collecting efforts in support of the *Catalogue of the Vascular Plants of Bolivia* (Jørgensen et al., in progress) concentrated on a previously undercollected area northeast of Apolo, in La Paz province. A species new to *Cuphea* P. Browne, the largest genus of Lythraceae with over 260 species (Graham et al., 1993), is described from those collections.

Cuphea nivea S. A. Graham, sp. nov. TYPE. Bolivia. La Paz: Franz Tamayo, Senda Apolo-San José de Uchupiamonas, a media hora antes de llegar al Naranjal, 1798 m, 1 Oct. 2002, *T. Miranda, C. Maldonado, F. Canqui, R. Alvarez & J. Tito 141 A* (holotype, LPB; isotype, MO). Figure 1.

Herbae perennes 15–25 cm, rhizomate crasso ad 1.5 cm diam.; caules 1–aliquot, pro parte erecti, ascendentes, strigosi et glanduloso-hispiduli. Folia ovata vel anguste ovata, 3–6 × 1.5–3 mm, coriacea, suberecta, uninervia, basi rotundata ad subcordata. Racemi simplices, foliati; pedicelli 1.5–2.5 mm. Flores 6-meri, 4–5 mm longi, sine calcari, glanduloso-hispiduli; petala 6, 1.7–2.3 mm longa, nivea, vinoso-nervata; stamina 11, profunde inserta, tubum longe non aequantia; ovula 4; nectarium basi ovarii 0.5 × 0.3 mm, erectum, carinatum. Semina orbicularia, 1.7 × 1.6 mm, exalata, margine obtusa.

Diminutive perennial herbs 15–25 cm; stems 1 to few, unbranched or sparsely, irregularly branched, from a woody xylopodium ca. 1.5 cm diam.; stems wine-red, densely strigose and glandular-hispid, the white, sharp-pointed trichomes appressed and antrorsely oriented, the glandular trichomes erect, 0.5 mm long; internodes slightly shorter to slightly longer than the subtending leaves. Leaves opposite, sessile, erect, loosely to tightly appressed to the stem, ovate to narrowly ovate, 3–6 × 1.5–3 mm, coriaceous, appearing uninerved, only the midvein visible, base rounded to subcordate, apex acute, margin slightly thickened or inrolled, upper surface glabrous, lower surface minutely white-strigose; leaves scarcely reduced in size toward the stem apex. Inflorescences simple leafy racemes; flowers solitary, alternate, interpetiolar; pedicels 1.5–2.5 mm; bracteoles 0.5 mm, obscure, green. Floral tubes 6-merous, 4–5 × 1 mm including a rounded base, the base extended 0–0.2 mm beyond the attachment of the pedicel, the neck of the floral tube not contracted, the mouth blunt; outer surface wine-red dorsally, green ventrally, white-strigose and glandular-hispid, the glandular trichomes costal and intercostal; calyx lobes equal, 0.5 × 0.7 mm, triangular; appendages of the epicalyx represented by wine-red thickenings at the sinuses of the calyx lobes, short-setose, the margin not free; inner surface neither bialate nor vesiculate, densely white villous above the stamens, glabrous below; petals 6, subequal, 1.7–2.3 × 0.8–1 mm, narrowly oblong-elliptic, white with wine-red midvein, the 2 dorsal petals subtended by a bright yellow nectar guide; stamens 11, the 2 dorsalmost shortest and inserted below the other 9, the 9 uniseriate, inserted deeply in the floral tube, alternately unequal, the anthers not reaching the sinuses of the tube; filaments glabrous to sparsely white villous; anthers light yellow; pollen triangular in outline, tricolporate, non-syncolpate, pores non-protruding; exine psilate at 40×; 15 μm diam.; style included, 2.5 mm, glabrous; stigma punctiform; placental base in the ovary fleshy, semi-circular with smooth margin, 2 mm wide at capsule dehiscence; ovules 4; nectariferous disc 0.5 × 0.3

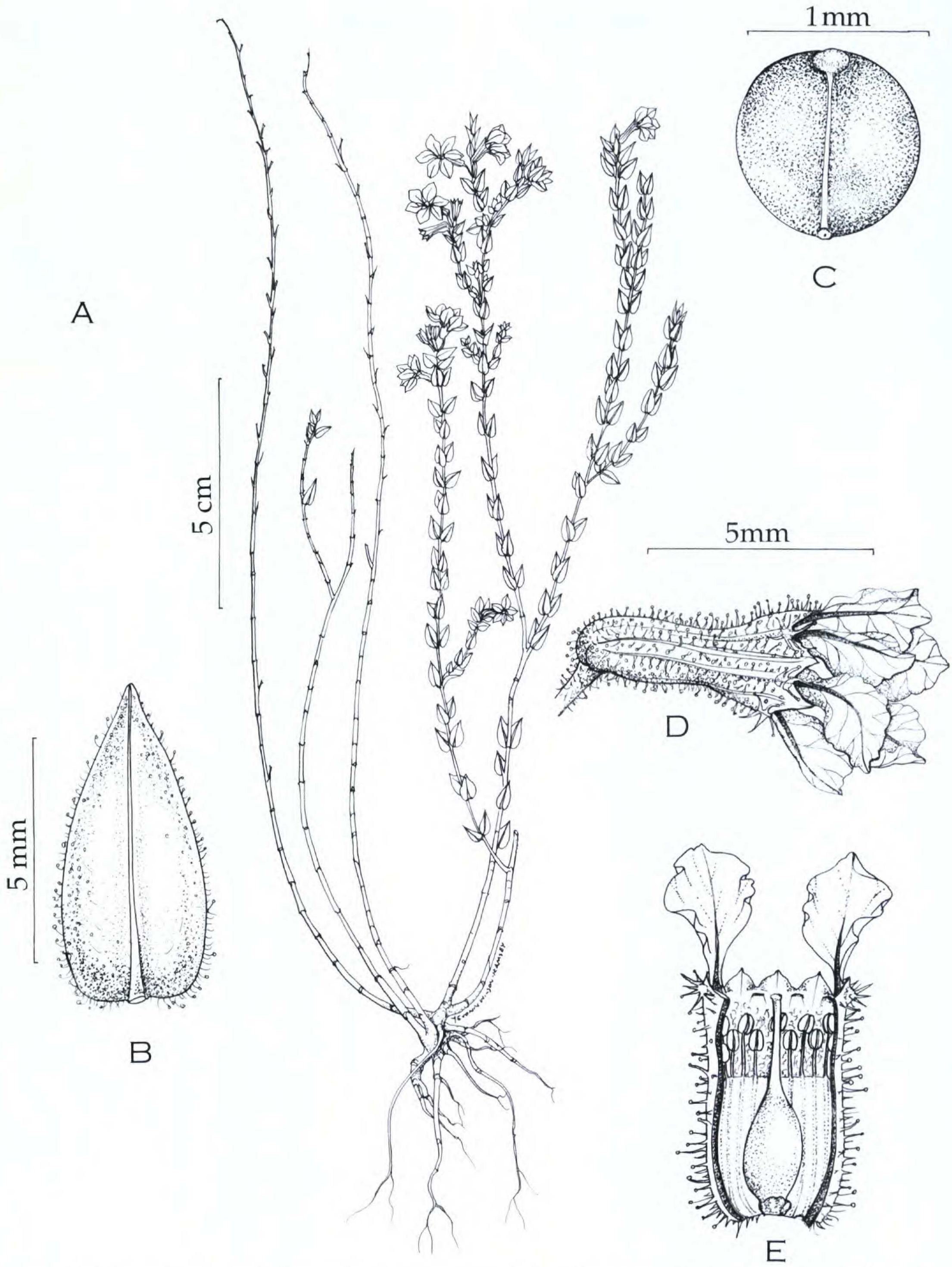

Figure 1. *Cuphea nivea* S. A. Graham. —A. Habit. —B. Leaf, abaxial surface. —C. Seed. —D. Flower, lateral view. —E. Flower opened dorsally, exposing the nectariferous, unilateral disc at the base of the ovary and the included stamens and stigma. Four petals removed for clarity. Drawn from the isotype, *Miranda et al. 141* (MO).

mm, erect at the base of the ovary, keeled. Seeds suborbicular to orbicular, 1.7 × 1.6 mm, light brown, the margin rounded, paler than the rest of the seed.

Distribution and phenology. Known only from the type area; in grassy pasturelands; 1785–1798 m. Collected in flower and fruit October, December, and April.

Cuphea nivea (sect. *Brachyandra*) is recognized by the bright white petals with wine-red midvein and the stems bearing thick, appressed, narrowly ovate leaves. Pure white petals are uncommon in the genus, although many species bear pink or pale purple petals or have four white ventral petals in combination with two purple dorsal ones. The specific epithet refers to the white petal color. The sectional assignment of the species follows the current classification of the genus (Koehne, 1903) in which section *Brachyandra* is defined by stamens so deeply inserted in the floral tube that the anthers do not reach the sinuses of the calyx lobes. Cladistic analyses based on morphology (Graham, 1998) and molecular data (Graham et al., in prep.) indicate that section *Brachyandra* is polyphyletic and the staminal character is part of a floral syndrome tied to an autogamous breeding system. The species that constitute the section represent at least four independent lineages, and the floral morphology of the primarily self-fertilizing species is convergent.

In section *Brachyandra*, *Cuphea nivea* shares seed and pollen features with species of the lineage that includes: *Cuphea calophylla* Chamisso & Schlechtendal, *C. melanium* (L.) R. Brown ex Steudel, and *C. ciliata* Ruiz & Pavón. Seeds of these species are non-winged with round, thickened margins, and the pollen is small for the genus (ca. 15 μm), nearly psilate, non-syncolpate, and without protruding pores (Graham, 1998). The habit of *C. nivea* approaches that of *C. ciliata*, an Andean species occurring from southern Venezuela to southern Peru. *Cuphea ciliata* differs in having more lax, much-branched stems, linear leaves that are not so consistently appressed to the stem, pedicels 7–14 mm, and 6 to 10 ovules, not 4 as in *C. nivea*. Stems of *C. nivea* are less woody and more erect than in *C. ciliata*, the leaves are more appressed, and the xylopodium is better developed.

The thick, heath-like leaves and woody xylopodia of *Cuphea nivea* are also characteristic of several, mostly Brazilian, species of section *Euandra* subsect. *Oidemation*, and *C. nivea* could, at first glance, be considered a member of that subsection. However, numerous differences in floral and pollen morphology indicate that the similarity is due to convergence. Members of both sections occur in open savannas where coriaceous, closely appressed leaves and xylopodia are considered advantageous to survival during seasonal fires. The presence of *C. nivea* suggests that the collection area, now pastureland given to cattle-grazing, was once a natural savanna subject to burning.

Paratypes. BOLIVIA. **La Paz:** Franz Tamayo, Senda Apolo-San José de Uchupiamonas, a 15 minutos del arroyo Turnia hacia el E de la senda, 2 Dec. 2002, *T. Miranda, C. Maldonado & F. Canqui 388* (LPB not seen, MO); a media hora antes de llegar al Naranjal, 17 Apr. 2003, *T. Miranda, L. Cayola, F. Canqui, R. Alvarez & J. Tito 718* (LPB not seen, MO).

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